Phrygilus coracinus Sclater, 1891, is a valid taxon

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On 30 April 1987 an almost totally black sierra-finch was mistnetted and collected at 4350 m altitude in the lower parts of extensive bushy woodland of *Polylepis tarapacana* on the slope of the Sajama volcano in arid western Oruro, Bolivia, near the Chilean border (loc. 94e in Fjeldså 1987). The bird resembled a male of the Patagonian *Phrygilus carbonarius*, but differed from it by having thin white wing-bars and by being larger, like *P. fruticeti*. On the following day a bird resembling a normal male *P. fruticeti* was seen on a rocky *Polylepis* slope a few km away (Loc. 94d), which could indicate that the collected bird was a melanistic individual of *P. fruticeti*.

Later it became clear that the blackish form had been described and named *Phrygilus coracinus* on the basis of a bird collected "8 leagues from Sacaya" in Tarapacá in northern Chile in 1886 by A. A. Lane (Sclater 1891; see also Lane 1891). However, the taxon was synonymized by Hellmayr (1932), who pointed out that the bird was in very worn plumage (lacking grey feather-edges) and that a less blackish specimen had been taken by Lane together with the *coracinus* type. Hellmayr (*op. cit.*) thus interpreted *coracinus* as a dark individual variant in an extremely worn dress. He also pointed out that the illustration (Pl.13) in Sclater (1891) conveys a wrong impression of the bird.

Having examined large numbers of *P. fruticeti* specimens, I here demonstrate that Hellmayr's synonymization of *P. coracinus* was also mistaken.

Specimens examined

The examination of specimens was done in 1987–89 as part of a general study of differentiation of populations of birds inhabiting shrubby habitats and relict woodlands in the high parts of the Andes. 259 specimens of *P. fruticeti* were studied in the following institutions: the American Museum of Natural History, New York; Academy of Natural Sciences, Philadelphia; Natural History Museum, London (Ornithology Department in Tring); Carnegie Museum, Pittsburgh; Field Museum of Natural History, Chicago; Louisiana State University, Museum of Zoology, Baton Rouge; L'Institute Royal des Sciences Naturelles, Bruxelles; Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires; Museo de História Natural "Javier Prado" de la UNMSM, Lima; Museo Nacional de Historia Natural, La Paz; Muséum National d'Histoire Naturelle, Paris; National Museum of Natural History, Smithsonian Institution, Washington, D.C.; Rijksmuseum van Natuurlijke Historie, Leiden; Royal Ontario Museum, Toronto: Swedish Museum of Natural History, Stockholm; Zoologisches Forschungsinstitut und Museum Alexander König, Bonn;

Universidad San Antonio Abad del Cusco; and Zoological Museum, University of Copenhagen.

Colour terminology follows Ridgway (1912).

Geographical distribution

Phrygilus fruticeti is widely distributed in Andean valleys and along the slopes in Argentina and Chile and northwards through Bolivia to northern Peru, from sea-level in the south, but mainly in the lower part of the temperate zone in the north (1500–3850 m). Within its wide range it is common locally in semi-arid zones and usually below the limit of regular nightly frost. It favours the shrub-steppe vegetation and may form semi-colonies in places with short-fallow shifting and some hedges and clumps of composite and solanaceous shrubbery, *Colletia* shrub and columnar cacti. It is generally absent from the high plateaus, except locally near the large wetlands, which may have a stabilizing effect on the local climate. On the basis of this general pattern it is somewhat surprising to find it locally in the arid puna zone of western Bolivia, mainly in the transition zone between the tolar steppe (*Lepidophyllum*) and the *Polylepis* scrub of the volcanic slopes (see Fig. 1, and Lieberman 1985 for typical habitat zonation).

Variations in measurements

The only measurement taken on all examined specimens is flattened wing-length. The variation for adult males in shown in Table 1 (females were poorly represented in certain parts of the range and are not shown; however, they appear to follow a parallel geographical pattern, with mean values 5 mm below those for males). The table shows a quite stable mean around 100 mm (but with a platykurtic variance) all the way from the south of the continent to northern Chile and the altiplano of Puno in Peru, and thereafter another level around 93 mm in the rest of Peru, in the inter-Andean basins as well as on the Pacific slope. Birds of the upper Urubamba Valley of Cuzco and on the Pacific slope in southern Peru are very variable, giving intermediate mean values. A comparison of males from north and south of this transition zone gives a coefficient of difference of 1.17, which corresponds to 88% joint non-overlap. However, the weight (data on some labels) appears to be constantly around 35 g (males) all the way, and according to Zimmer (1924) the same lack of variation holds true also for bill and tarsus. Therefore, the only variation seems to be in the relative wing-length.

General plumage description

Comparing plumage colours is complicated by the seasonal variation caused by wear of the feather edges. Fresh-moulted birds (during the southern winter) are rather uniform drab-coloured with broad ochraceous tawny to drab-grey feather-edges (pale grey on the black foreparts) and very little of the black feather-centres shining through. These edges wear off in the more contrasting breeding dress. Thus, it is necessary to examine the hidden parts of the plumage and judge what each individual bird would look like if it were in full breeding garb. In this condition, adult males are characterized by extensive deep gull-grey areas

Figure 1. Records of typical *Phrygilus fruticeti coracinus*, with the distribution of *Polylepis* scrub on lava plateaus and volcanic slopes in western Bolivia shaded.

TABLE 1

Wing-lengths (flattened, mm) of males of *Phrygilus fruticeti* from different parts of the range. N Peru is defined as montane basins of northern Peru and Pacific slope south to Ica; C Peru as the valleys of Huancavelica, Ayacucho and Apurímac; S Peru as the Pacific slope of southern Peru; S Bol as the valleys of Potosí, Chuquisaca and Tarija; W Bol as the high plateaus of western La Paz, Oruro and Potosí and adjacent Chile, inhabited by *P. fruticeti coracinus*; C Chile is from Coquimbo to Puerto Montt. Other geographical names are single Departments, or otherwise self-explanatory.

Area	*n*	Wing-length mean	s.d.
N Peru	22	93.0	2.2
C Peru	14	92.5	2.3
Cuzco	36	95.6	2.5
Puno	6	97.9	2.2
S Peru	9	97.2	3.2
W Bol	5	104.8	3.1
La Paz	10	98.2	2.2
Cochabamba	14	100.2	2.3
S Bol	7	100.4	2.1
Atacama desert	4	103.6	1.2
C Chile	13	98.2	2.3
Argentina	7	98.3	1.8

especially on sides of head, neck and body and on lower back and rump; the remaining upperparts grey with black streaks but some feather-edges on crown, mantle and humerals ochraceous; black throat and breast and white lower underparts. Females have grey parts partly replaced by light ochraceous, the grey breast streaked black, ear-coverts warm orange-brown, and the face distinctly patterned with white whiskers separated by blackish malars from the white upper throat. Juveniles are buffier with fine streaks on the sides. In all plumages, the median and greater wing-coverts are tipped white, forming two wing-bars which are 5 mm broad in typical males.

Geographical variation in colours and pattern

In general, Peruvian males have narrow (tapering) dark streaks on the crown and (notably) hindneck, extensively deep gull-grey sides of head and heavy blackish stripes on mantle and humerals. A quite similar colouration was found also in birds from Putre (Tacna) and further south in Chile, and in Patagonia, but these birds usually appear slightly more ochraceous grey, with the dark dorsal streaks diluted to a dull earth-brown. Birds of the Altiplano of southern Peru and Bolivia had broader crown-streaks often invading the otherwise grey areas on cheeks and ear-coverts.

On the whole, the variation is subtle so far, as also indicated by the accounts of Zimmer (1924) and Hellmayr (1932). However, birds from the arid puna of western Bolivia are strikingly different, and correspond to "*Phrygilus coracinus*": males are black almost throughout, save for some thin grey or clay-coloured feather-edges, especially above (foreparts of a bird in fresh plumage shown on Plate LVIII 9d in Fjeldså & Krabbe 1990); males in worn dress are jet black, except for traces of grey streaks on back and rump, and conspicuous white feather-tips only in the cloacal region and vent. The white wing-bars and pale grey tail-tip are always very narrow (1–2 mm). The legs (of the Sajama bird) were darker orange brown than the light brown or straw colour in birds from lower-altitude sites in Peru and Bolivia (live birds handled on several occasions).

Adult females (by label data) from this area have grey and black foreparts and almost match adult males of other populations; the only constant difference being paler grey lores grizzled with blackish feather-tips, instead of fully black lores, and the ear-coverts showing some brown tinge. They are thus entirely different from the ochraceous-washed females of other populations.

Most *coracinus* specimens have been collected by M. A. Carriker, Jr., and have been available to many other students. However, no-one has commented on their distinctive characters. This may have two reasons: the species was viewed as widespread and uninteresting 'trash', and series with black males and females resembling 'normal' males give the immediate impression of strongly variable males.

Typical *coracinus* specimens are from the Sajama volcano (1), Llica west of Uyuni salt-lake (7), Uyuni (3), Llallagua (2) and Sacaya (the type in the Natural History Museum) (Fig. 1); furthermore there was one aviary specimen (Carnegie Museum, misidentified as *P. carbonaria*).

M. Kessler (pers. comm.) saw *coracinus* in *Lepidophyllum* habitat in the Sajama area and further southeast near Turco but not further south, and the range is probably restricted mainly to the mosaics or ecotones of *Lepidophyllum* and *Polylepis* shrubbery in western Bolivia (stippled area in Fig. 1). The localities are at 3700–4400 m. At Sacaya (altitude variously given as 3050, 3800 and 3960 m) it may have been a visitor from higher altitudes, as the locals did not know the bird (Lane 1891).

This form is so distinctive that one could immediately suspect it to be a separate species. However, some intermediate specimens exist in collections, suggesting hybridization in the adjacent ecotones. One intermediate male was taken at Sacaya with the type of *coracinus* (Hellmayr 1932), another at Pampa Aullagas at 3700 m in Oruro, and individuals coming closer to 'typical' Bolivian birds are from Potosí (1) and Callipampa near the north corner of Lake Poopo in Oruro (4). Slight tendencies towards *coracinus* were seen in single individuals (among normal specimens) from the upper Pilcomayo drainage west of Potosí, Cerdas in Potosí, and from Nor Cinti in Chuquisaca. As stated above, a rather strongly black-streaked crown and face characterises most Bolivian specimens, but was not shown by a series from Putre in Tacna in northernmost Chile.

Specimens of transitional types are almost as well represented in collections as typical *coracinus*. However, I am sure that this is a sampling error, because much more collecting has been done along the main roads following the eastern edge of the Altiplano (which appears to be the hybrid zone) than in desolate western Bolivia.

Conclusion

I propose that *coracinus* be recognized as a well-marked subspecies with a small range in western Oruro and Potosí and maybe into the very nearest alpine zone of northern Chile. The typical life-zone of *P. fruticeti coracinus* may be the pumice slopes and lava formations with scattered *Polylepis* shrubbery fringing low-lying areas with *Lepidophyllum* steppe and small meadow-like areas. *P. fruticeti* sometimes ascends to the lower fringes of *Polylepis* woodlands (3850 m) elsewhere in the Andes, but these habitats in western Bolivia are generally above 4000 m and climatically much more extreme. This part of the puna zone is characterized by drought, very clear air and blazing sun. Mid-day temperatures are pleasant, but the nights and early mornings are biting cold, especially on the plains below the *Polylepis*-dotted slopes.

Bird species with wholly or partly black plumages are generally well represented in desert, especially in desert mountains. Thus *P. fruticeti coracinus* can be seen as an example of a more widespread adaptive trend. It may be no coincidence that the 'hooded' sierra-finches have a black-headed representative (*Phrygilus atriceps*) in the arid parts of the high Andes, and furthermore that its populations in the most arid western part of the central range have almost black wings (Fjeldså & Krabbe 1990: 661). Black colour should cause increased heat gain and reduce the harmful radiation that penetrates to the skin, and it increases a feather's resistance to wear (Finch *et al.* 1980, and especially Burtt 1986), all of which should be valuable in the climate of western Bolivia.

The northern subspecies *P. fruticeti peruvianus* is poorly differentiated; the joint non-overlap of 88% with southern birds in wing-lengths of males is slightly below the conventional level for subspecific difference of 90%, but the northern birds differ additionally by having more distinctive black streaking on their backs. I will therefore recommend maintaining this subspecies. Zimmer (1924) defined the range of *peruvianus* as Peru, but as he had specimens only from the northern part of the country, and no specimens from Bolivia or extreme northern Chile, he could not know where to draw the line between the two subspecies. Hellmayr (1932) extended the range of *peruvianus* to La Paz (but this is hardly supported by his list of measurements), and Paynter (1970, with no evidence stated) extended it to Cochabamba in Bolivia. Judging from Table 1 and plumage colours (see above), *peruvianus* is restricted to Peru north of Puno and Arequipa. The main 'filtering barriers' for gene-flow may be the transverse mountain ranges westwards from Abra La Raya on the Puno/Cuzco border. South of this barrier there is some variation in colours, males from outside the *coracinus* range in Bolivia showing more or less extensively black-streaked faces. However, this differentiation is too subtle for defining an additional subspecies.

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